

*Dub 11*

1 Claim 1. A process for automatically detecting and precisely handling  
2 exceptions in a sequence of pipelined floating point instructions  
3 comprising the steps of:  
4 automatically inserting a command that tests for and raises floating  
5 point status exceptions into a sequence of instructions to be executed,  
6 responding to an exception raised during pipelined execution of the  
7 sequence of instructions by returning execution to an instruction in the  
8 sequence of instructions at which correct state is known, and  
9 executing each instruction in the sequence singly to completion until the  
10 exception is again raised.

1 Claim 2 A process as claimed in Claim 1 in which the command is  
2 inserted in the sequence after a last floating point instruction and before  
3 floating point status is saved.

1 Claim 3. A process as claimed in Claim 2 in which the command is  
2 inserted after a branch in the sequence.

1 Claim 4. A process as claimed in Claim 2 in which the command  
2 stalls the pipeline if the last floating point instruction has not completed  
3 execution when status is to be saved.

1 Claim 5. A process as claimed in Claim 2 in which the command does  
2 not stall the pipeline if the last floating point instruction has not  
3 completed execution when status is to be saved.

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1 Claim 6. A process as claimed in Claim 5 in which floating point  
2 status saved is floating point status existing when integer status is  
3 saved.

1 Claim 7. A process as claimed in Claim 5 in which floating point  
2 status saved is floating point status generated by floating point  
3 operations which have completed when integer status is saved.

1 Claim 8. A process as claimed in Claim 1 in which the command  
2 compares accumulated condition of exception status detected during  
3 execution of the sequence of instructions with armed floating point  
4 exception conditions.

1 Claim 9. A process as claimed in Claim 8 in which the command  
2 executes and compares accumulated condition of exception status  
3 detected when integer status is saved.

1 Claim 10. A process as claimed in Claim 8 in which the command  
2 raises an exception only if newly accrued exceptions have not previously  
3 been committed.

1 Claim 11. A process as claimed in Claim 8 in which exception status  
2 detected includes exceptions generated by a command for manipulating  
3 memory operands used in floating point stack operations.

1 Claim 12. A process as claimed in Claim 11 in which no exception is  
2 raised if the corresponding exceptions generated by a command for  
3 manipulating memory operands used in floating point stack operations  
4 are not armed and have already been reported.

Part A1

1      Claim 13. Apparatus for automatically detecting and precisely handling  
2      exceptions in pipelined floating point instructions comprising a  
3      computer-executable software process which automatically inserts  
4      commands that test for and raise exceptions indicating floating point  
5      status exceptions into a sequence of instructions to be executed during  
6      dynamic translation of target instructions,  
7      a computer-executable software process for responding to exceptions by  
8      rolling execution of a sequence of instructions back to a point at which  
9      correct state is known, and  
10     a computer-executable software process for executing each instruction in  
11     the sequence singly to completion until the exception is again raised.

